

# DOINGWHATWORKS



## Presentation

FULL DETAILS AND TRANSCRIPT

### Developing a Mastery Framework

June 2008

Topic: National Math Panel: Critical Foundations for Algebra  
Practice: Mastery Framework

#### Highlights

- The teachers meet with the district math supervisor to review the six-week benchmark test results
- Components of a mastery framework, including clearly stated benchmarks, regular and ongoing formative assessments, and differentiated instruction to address all students' needs
- Using benchmarks to sequence concepts and skills to be mastered across grade-levels
- The Panel's recommended benchmarks
- Types of formative assessment
- Ways teachers can use formative assessment to check student understanding
- Using formative assessment to identify needs and adapt instruction
- Differentiating instruction for struggling students, for example using explicit instruction and multiple representations
- Acceleration and enrichment for mathematically gifted students

## Full Transcript

### Slide 1

Welcome to the overview on Developing a Mastery Framework.

### Slide 2

Here are a few tips before we get started... Use the slide titles in the “outline” to jump to a specific section. Click on the “script” tab to follow along with the narration. Use the controls at the bottom to easily stop and start the presentation, and show or hide the navigation using the windows icon.

### Slide 3

Everyone in New Rivers district is buzzing about the results of the six-week benchmark tests. It’s the first time this year that students are checked to see which key mathematics topics they’ve mastered. Mr. Trenton, the district math supervisor, notes that most students have met grade-level benchmarks. He believes this validates the new focused curricula they’ve been working hard to implement.

### Slide 4

However, while many are succeeding, some students in each classroom are falling behind. Mr. Trenton asks teachers for ideas about how to help more students achieve proficiency. One teacher points out that they can’t wait six weeks for the next benchmark tests to adjust their teaching strategies. They need to know immediately who needs extra help.

### Slide 5

A new teacher says that she has students who are struggling and need more practice during the regular math period. An experienced teacher adds that while she has low-achieving students as well, she also has students who can go far beyond the benchmarks and doesn’t want to hold them back. Mr. Trenton acknowledges that all the systems needed to support teachers and students are not yet in place.

### Slide 6

He decides to revisit the recommendations about mastery and formative assessment from the National Mathematics Advisory Panel before determining a course of action. He quickly realizes the need to align

benchmarks, formative assessments, and interventions.

#### Slide 7

A mastery framework is a way of organizing those elements to ensure that all students achieve proficiency.

#### Slide 8

A well-developed framework incorporates clearly stated mathematics benchmarks, regular and ongoing formative assessments, and varied or differentiated instruction to address all students' needs.

#### Slide 9

Let's first consider mathematics benchmarks. Benchmarks are statements describing the sequence of important mathematics concepts and skills to be mastered across the grades. Students approach these benchmarks in sequence, mastering a topic before advancing.

#### Slide 10

While no definitive research dictates what should be accomplished at each grade level, there is consensus among experts about the progression of topics based on nationally and internationally accepted standards. The National Mathematics Panel report lists benchmarks for the elementary and middle grades to guide school and district planning.

#### Slide 11

The report includes benchmarks, or mastery points, for the topics of whole numbers, fractions, and geometry and measurement.

For example, students at the end of grade 5 are expected to be proficient with: multiplication and division of whole numbers; comparing fractions and decimals and common percents, with the addition and subtraction of fractions and decimals; problem solving in geometry that involves perimeter and area of triangles and all quadrilaterals having at least one pair of parallel sides.

#### Slide 12

As students move along this benchmark path, by the end of seventh grade, they should be proficient with:

all operations involving positive and negative fractions; problem solving that involves percent, ratio, and rate, extending this work to proportionality; geometric relationships between similar triangles; and the concept of the slope of a line. Proficiency in these mastery points is the result of previous work on skills and topics related to whole numbers, fractions, and geometry and measurement.

#### Slide 13

Having a set of benchmarks is only the starting point. A mastery framework also includes formative assessment strategies and tools at the classroom level to guide instruction.

#### Slide 14

Formative assessment helps pinpoint where students might be having difficulty understanding. Quizzes, tasks, structured reviews of student work, observations, and assignments are some examples of formal and informal ways to help teachers monitor whether a student is grasping the skills being taught.

#### Slide 15

There are numerous ways in which a teacher might check for understanding. She may have students solve problems by using personal white boards, allowing her to observe individual responses, or have several children solving problems at the board. Alternatively, a teacher could use “exit slips,” posing a problem that students solve before they leave for the day, allowing him to quickly check understanding.

#### Slide 16

Formative assessment helps teachers identify concepts that the whole class needs more work on, learn which students are struggling with particular concepts, and pinpoint the types of errors students are making, so those can be corrected immediately.

#### Slide 17

The National Mathematics Advisory Panel recommends using formative assessment once or twice a week when working with students who struggle with mathematics.

## Slide 18

Formative assessments can be more effective when teachers receive guidance on how and when to use them. Enhancements, or suggestions for how to help students develop particular skills, are valuable additions.

## Slide 19

Frequent classroom assessment can help teachers differentiate their instruction if results are efficiently organized. When adding formative assessments, it's vital to plan for a system to analyze and display information so teachers can easily take action.

## Slide 20

All students benefit from regular, explicit, and systematic instruction. However, low-performing and learning disabled students are particularly served by clear demonstrations, explanations, and modeling.

## Slide 21

When we talk about explicit instruction, we mean: providing clear models of step-by-step strategies for solving different types of problems; using many different kinds of examples; providing extensive practice exercises for using newly learned strategies and skills; encouraging students to "think aloud" and talk through decisions they make and steps they take; and giving extensive and specific feedback along with correction.

## Slide 22

Here's an example of how this might look in a classroom. After demonstrating how to solve several division problems on the board, a teacher asks students to solve similar problems while showing all their work. He asks four students to solve the problems at the board. After they complete their first three problems, students explain their work to the class. Also, as a teacher walks around the room checking work, he pauses to work through problems with students that he notices are making errors.

## Slide 23

Struggling students benefit from multiple representations, such as story contexts, hands-on materials, and visual examples and models. For example, telling a story about bundling items together in order to sell

them, might be followed by an exercise that has students working with manipulatives, such as base ten blocks, to work on regrouping concepts.

#### Slide 24

Differentiated instruction can benefit not just struggling students, but can also support mathematically gifted students.

#### Slide 25

Research suggests that accelerating the introduction of new concepts, combined with the enrichment of instruction with more complex material or deeper exploration of the material, is the best instructional approach for mathematically gifted students.

#### Slide 26

Gifted students need a challenging curriculum that offers the proper level, complexity, breadth, and depth. The curriculum might be conducted at a more rapid rate and include more formal mathematics such as abstract algebra or number theory, or mathematical analysis.

#### Slide 27

A well-developed mastery framework can have a powerful impact on instruction.

#### Slide 28

New Rivers staff aligned formative assessments with their benchmarks. They now monitor student learning on a regular basis and have a clear understanding of each student's progress. Teachers are now able to target instruction to reach students at all points of the learning continuum from low-performing to mathematically gifted students.

#### Slide 29

To learn more about Mastery Frameworks, please explore the additional resources on the Doing What Works website.